1. A photosensing organic field effect transistor (POFET), comprising:

a substrate insulating layer, the insulating layer having a high relative dielectric constant and a first side and a second side;

a gate electrode, the gate electrode being an electrical conductor, the gate electrode being positioned adjacent to the first side of the insulating layer;

a semiconducting polymer layer, the semiconducting polymer layer being responsive to incident light, the semiconducting polymer layer having a first side, a second side, a first end and a second end, the second side of the semiconductor layer being adjacent the second side of the insulating layer;

a source electrode, the source electrode being an electrical conductor, the source electrode being in electrical contact with the first end of the semiconductor layer; and

a drain electrode, the drain electrode being an electrical conductor, the drain being in electrical contact with the second end of the semiconducting polymer layer.

2. A POFET, comprising:

a substrate insulating layer, the insulating layer having a high relative dielectric constant and a first side, a second side, a first end and a second end;

a gate electrode, the gate electrode being an electrical conductor, the gate electrode being positioned adjacent to the first side of the insulating layer;

a source electrode, the source electrode being an electrical conductor, the source electrode being in electrical contact with the first end of the second side of the insulating layer;

a drain electrode, the drain electrode being an electrical conductor, the drain electrode being in electrical contact with the second end of the second side of the insulating layer; and

a semiconducting polymer layer, the semiconducting polymer layer being responsive to incident light, the semiconducting polymer layer being in electrical contact with the second side of the insulating layer and the source electrode and the drain electrode.

3. The POFET of claim 1, wherein the semiconducting polymer layer further comprises a photoconducting polymer having a field effect mobility of 10^{-2} cm^2/V-sec or greater.

4. The POFET of claim 1, wherein the insulating layer has a dielectric constant of 3.0 or greater.

5. The POFET of claim 1, wherein the insulating layer is further comprised of a polymeric material.

6. The POFET of claim 5, wherein the polymeric media is polyvinyl alcohol.

7. The POFET of claim 5, wherein the polymeric media is polymethyl methacrylate.

8. The POFET of claim 1, wherein the insulating layer is further comprised of an inorganic material.

9. The POFET of claim 1, wherein the insulating layer is at least semi-transparent to optical radiation.

10. The POFET of claim 1, wherein the insulating layer is further comprised of SiO_2.

11. The POFET of claim 1, wherein the gate electrode is partially transparent.

12. The POFET of claim 1, wherein the semiconducting polymer layer further comprises a polymer matrix including, in dilute quantities, one or more electron acceptors selected from the group consisting of buckminsterfullerene C_{60} and derivatives thereof, viologen, dichloro-dicyano-benzoquinone, nanoparticles of titanium dioxide, nanoparticles of cadmium sulphide and the like, thereby enabling electron transfer from the polymer matrix upon photoexcitation in order to obtain a high photo-induced current between the drain and source electrodes.

13. The POFET of claim 1, wherein a drain current (and transistor ON state) is independently controllable by a voltage applied to the gate electrode and by the intensity of light incident upon the POFET.

14. The POFET of claim 1, wherein the semiconducting polymer layer further comprises a regioregular polyalkylthiophene with 98.5% head-to-tail regiospecific conformation.

15. The POFET of claim 14, wherein the regioregular polyalkylthiophene is Poly (3-octylthiophene).

16. The POFET of claim 14, wherein the regioregular polyalkylthiophene is Poly (3-hexylthiophene).

17. A method of fabricating a POFET, comprising the steps of:

coating a glass substrate with a semi-transparent gate electrode;

depositing upon the gate electrode an electrically insulating layer having a first side and a second side, the first side adjacent to the gate electrode;

forming on the second side of the insulating layer a semiconducting polymer layer comprised of a regioregular polyalkylthiophene responsive to incident light and having a 98.5% head-to-tail regiospecific conformation; and

forming on the semiconducting polymer layer electrically conducting source and drain electrodes.

18. The method of claim 17, wherein the insulating substrate is comprised of a polymeric media.

19. The method of claim 17, wherein the insulating substrate is partially transparent.

20. The method of claim 17, wherein the semiconducting polymer layer further comprises a polymer matrix including, in dilute quantities, one or more electron acceptors selected from the group consisting of buckminsterfullerene C_{60} and derivatives thereof, viologen, dichloro-dicyano-benzoquinone, nanoparticles of titanium dioxide, nanoparticles of cadmium sulphide and the like, thereby enabling electron transfer from the polymer matrix upon photoexcitation in order to obtain a high photo-induced current between the drain and source electrodes.

21. The method of claim 17, wherein the regioregular polyalkylthiophene is Poly (3-octylthiophene).

22. The method of claim 17, wherein the regioregular polyalkylthiophene is Poly (3-hexylthiophene)

23. The POFET of claim 1, wherein a POFET saturation current gain of 100 or higher may be achieved.

24. A method of using a POFET as a logical element, comprising the step of:

activating a transistor ON state by controlling gate bias or the intensity of incident light.

25. A method of using a POFET as a logical element, comprising the step of:

activating a transistor ON state by controlling gate bias and the intensity of incident light.

26. A method of using a POFET as a backbone of a position sensitive detector, comprising the steps of:

positioning one or more photosensing organic FETs in a beam of light incident from an object to be imaged; and

monitoring the variation of drain current(s) from the one or more photosensing organic FETs, wherein the drain current(s) vary with the spatial position of the incident light beam.

27. A method of controlling the electrical properties of a POFET, comprising the step of:

varying the intensity of light incident upon the photosensing organic FET, thereby varying the carrier concentration in the channel region and the drain-source current.